

**The Way of Region's internal industrial reserves identificatio***Revista Publicando, 4 No 13. No. 2. 2017, 339-352. ISSN 1390-9304***The way of region's internal industrial reserves identification****Azat Rashitovich Safiullin<sup>1</sup>, Diana Shamilevna Usanova<sup>2</sup>, Dilyara Irekovna****Ravzieva<sup>3</sup>, Aliya Ajupovna. Shugaepova<sup>4</sup>****1 Kazan Federal University, Institute Of Management, Economics And Finance****2 Kazan Federal University, Institute Of Management, Economics And Finance, E-  
diana-diana@rambler.ru****3 Kazan Federal University, Institute Of Management, Economics And Finance****4 Kazan Federal University, Institute Of Management, Economics And Finance****SUMMARY**

The article deals with the methodology of the designing of region's industrial profile. It may provide a balanced and sustainable socio-economic growth of the territory. We analyzed region's economic activities, conditions of each of the region. The temporal aspect affects the six years from 2007 to 2012, separately considering the crisis period, determining the extent of its impact on the indicators of economic development. At the first stage of the study carried out a structural analysis of EA's markets, each evaluates in order to assess the degree of region's influence on the market as a whole. In order to determine the level of competition on the EA's market concentration ratio was calculated Herfindahl-Hirschman Index. In order to determine the degree of specialization of the region in a particular EA there were used the coefficient of localization of industrial production that is used in practice for economic justification of production allocation. Assessment of business environment and the attractiveness of the region for employees, realized through dynamic analysis of the internal socio-economic indicators. We hold a cluster analysis of regions on the markets of analyzed economic activities with the purpose is to define the "ideal" clusters for each of the EA and to select those regions whose parameters satisfy the conditions of measured cluster. As a result, for each EA prepared a list of regions whose values had occasion to enter the cluster boundaries. Thus, for these regions analyzed EA is a prioritized for inclusion it in the region's industrial portfolio, having favorable conditions for the operation facilities and provides the best current position for leading regions. The presented methodology helps to outline the features of the regional strategic development and to design the portfolio of types of economic activities, ensures the implementation of region's strategic priorities. The main



methods of the study are following; structural analysis of the regional economy, strategic planning and cluster analysis methods and binary logic.

**Key words:** competitiveness, regional development, type of economic activity, labor costs, production allocation, economic activity

## **1. INTRODUCTION**

Overcoming of existing differentiation among the regions of Russian Federation, their heterogeneity and differences are the key points of national and regional policies aimed to ensure the balance in socio-economic development of the country and to define the waymarks of environment enabling to guaranty the decent living conditions for citizens, multipurpose development and growth of competitiveness. The main task, explaining the necessity of assessment and analysis of competitiveness factors, socio-economic development, investment attractiveness and business activity of regions, is selecting the direction of regional economy growth in order to create a proper local development strategy of the territory and economic activities, localized and formed its industrial basis. As there are variety of approaches and models of regional development, each proposes its own interpretation of conceptual construct of the regional strategy development and its own tools for assessing the competitive socio-economic situation in the region. With a variety of tools of qualitative and quantitative evaluation the only similarity of regional planning approaches is the necessity to identify strategic waymarks.

The need in the approaches of defining the priority directions of regional economy's development, as declared at the federal and regional levels, the lack of formed long-term development policy, the need to enhance and balance the regional economies determined the relevance of the theme, settled goals and objectives of the study.

## **2. THEORY**

The study devoted to the structural diagnosis of factorial signs of economic activities development at the industrial and regional levels, it's contributing the development of the regional strategic priorities and the forming the recommendations for selecting the areas with the most attractive conditions for the production placement.

The main objective of the research is to study the features of the strategic development of the region and to develop an approach of designing the portfolio of types of economic activities, providing strategic priorities to the territory of localization.



In modern theories of regional economy the region studied as a multi-functional and multi-aspect system. One of the most common paradigm is a region as a quasi-corporation, which is a large subject of property and economic activity. In this way regions become participants of competition at the markets for goods, services and capital. The independence of regional authorities from the federal government in a number of seals contributes to the actualization of this approach in regional management (Kopytova,2012).

Approach to the region as a quasi-corporation let takes into account the territorial features, competitive advantages and limitations of the regional economy, which helps to create the most realistic picture of the present and future scenarios of strategic development in the long-term planning horizons. Effective strategic management of the region's development means a special emphasis on the rationale the choice of perspective directions of development of the territory, which is fit into the overall strategy of regional policy (Hoover,1985).

The theories of structuring and effective organization of economic territory are based on the performance attributes of production's space organization and allocation of industrial and transportation hubs and territorial production complexes (Botasheva,2011; Gerasimova,2002; Koh,2009).

An overview of modern and classical theories of regional management allowed us to come to the conclusion that regional policy in the field of economic development should be built on the basis of existing environment's conditions and potential development capability. As the analysis of regional management practices shows, usually the composition of the prioritized economic activities (EA) focuses on the existing (core) industries and economic activities that are traditionally operate in the region because of the previous politico-economical conditions of inter-territorial specialization of labor (Ravzieva,2014). The concept and the purpose of strategic regional development is formation the priority centers of industry that can have a stimulating effect on the development of the territory (Milyaeva,2012).

In the approach of understanding the region as an independent business entity, general theories regarding corporate management might be applicable as well as at the regional level. The main area of application the portfolio theory is an analytical study of

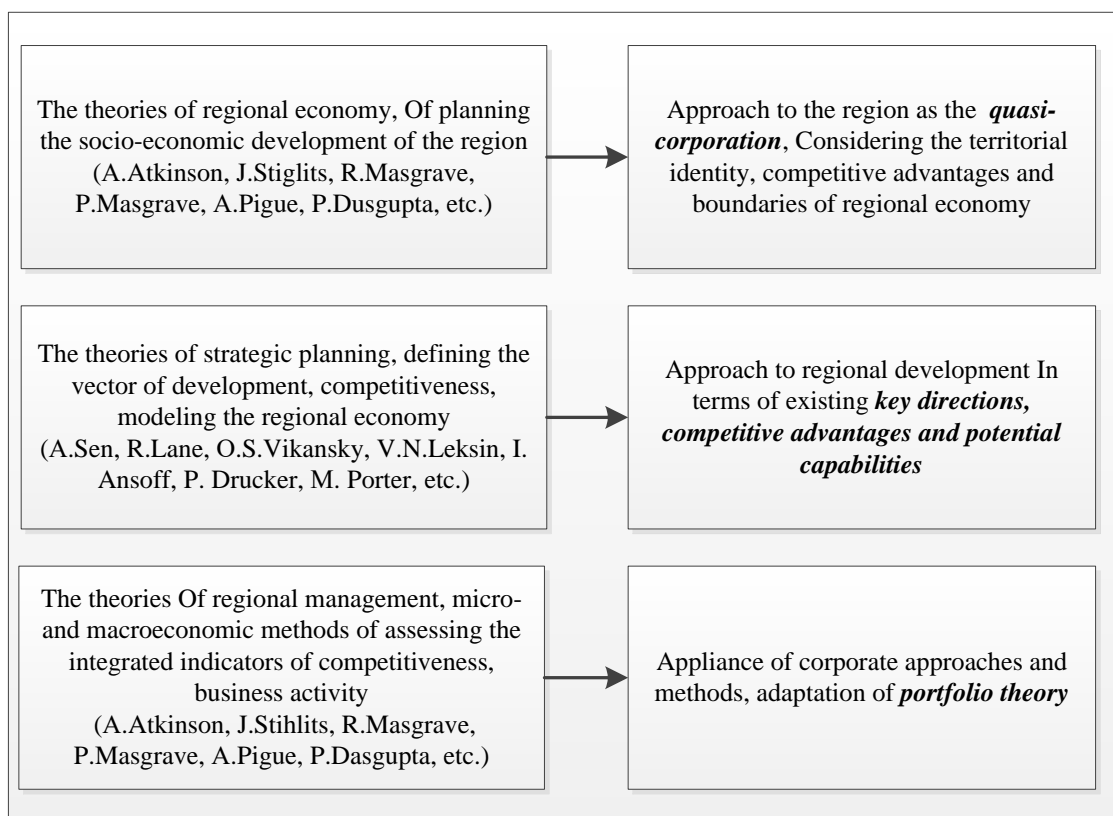


investment decisions regarding investments simultaneously in several different investment assets.

The main task, which can be solved using the portfolio theory, is determining the optimal combination of available investment assets based on their characteristics and trends at the relevant markets. Based on the different author's approaches of understanding and application the portfolio theory (Botasheva,2011; Hoover ,1985; Milyaeva,2012; Sorokina,2012) in the framework of this study, the concept of the investment portfolio will be considered in relation to real assets.

An important criterion of portfolio designing is determining the proportions between investment objects with different characteristics. For the regional level, these characteristics presume a compromise between capital-intensive, labor-intensive, capital productivity, capital-labor ratio, etc. That said the presence of unique competitive advantages, contributing to the development of similar EA in the region, presume the optimal amount of costs at the favorable market environment that are provide the greatest return from placing EA productions at the territory of the region.

The review of theoretical and practical scientific literature in the field of regional, strategic, financial and project management resulted in worded and defined conceptual framework for the purpose of further study, and in the defined main approaches to the EA's portfolio designing based on the principles of regional strategic development (Figure 1).



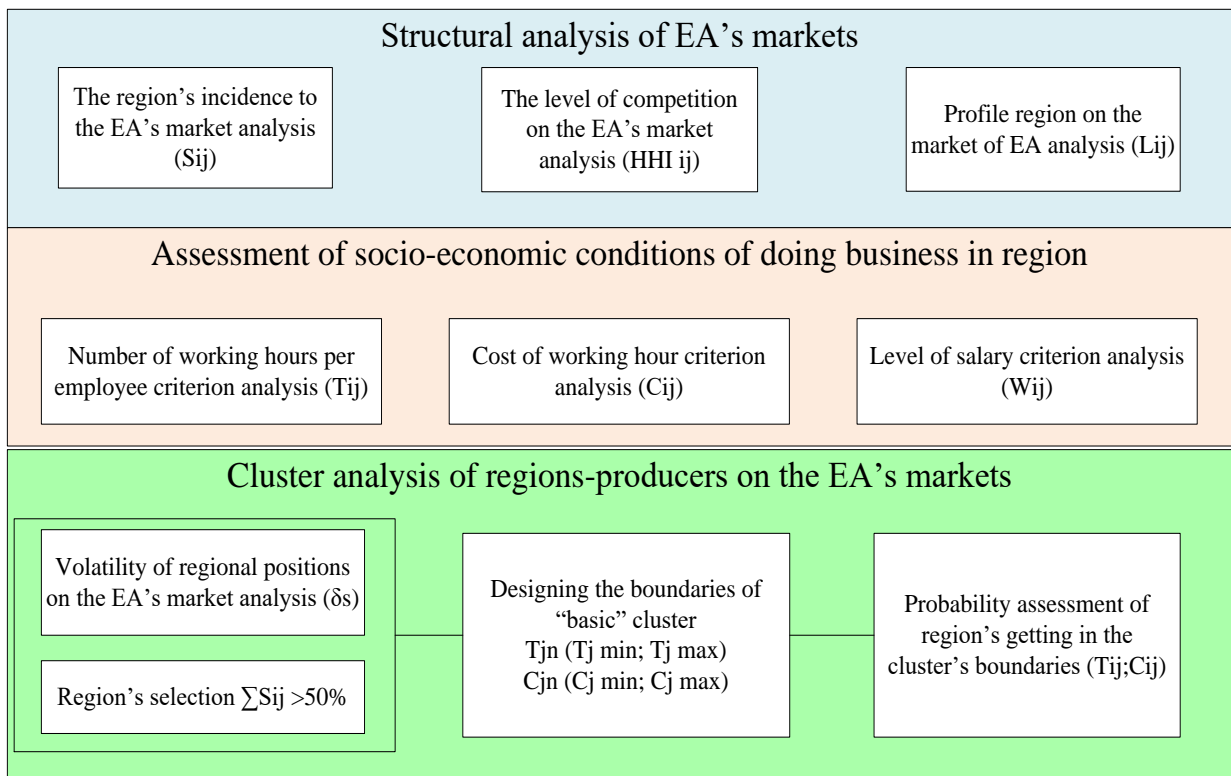
**Figure1. Basic approaches of researching the prioritized EAs at the regional level**

### 3. METHOD

Thus, the research is based on the methods of productions spatial allocation by designing a portfolio of economic activities taking into account the functional attributes of territorial production complex's spatial organization. Designing the portfolio based on defining the strategic waymarks (prioritized EA) (Ravzieva,2013) and the current dominant processes in the economic development of regions (core EA) (Ravzieva,2013)

So, the task of ongoing research is designing a portfolio of prioritized economic activities at the regional level for the subsequent combination them in portfolio of the region, contributing to the diversification of the economic structure, achieve economic security, ensuring sustainable development of the economy and socio-economic stability.

The methodological approach represents a multi-level analysis, which consists of several stages: a structural analysis of the markets, the dynamic analysis of the socio-economic indicators of regions, cluster analysis of EAs (Figure 2).



**Figure 2. Methodology of the study**

The study represents an analysis of several sections. Firstly, in the context of economic activities, which are the basis of the analyzed region's economy. Secondly, in the context of regions, i.e., the analysis of operating conditions of each of the region. Third, the temporal aspect affects the six years from 2007 to 2012, separately considering the crisis period, determining the extent of its impact on the indicators of economic development. At the first stage of the study carried out a structural analysis of EA's markets, each evaluates in order to assess the degree of region's influence on the market as a whole. Indicator ( $S_{ij}$ ), which measures the degree of influence presumed the region's share in total industry share of the Russian Federation. The basis for the distribution of market shares is indicator of average headcount in each type of economic activity. The reason of choice was that the average headcount is a key indicator of business activity and economic climate, allowing to conclude about the volumes of production expressed as the number of employees required to produce the specified volumes. In order to determine the level of competition on the EA's market concentration ratio was calculated (Herfindahl-Hirschman Index) (Formula 1) (Hausmann, 2014).



$$HHI_j = \sum_{i=1}^n S_{ij}^2, i = (1 \dots n), \quad (1)$$

$HHI_j$  – concentration ratio of production of j EA.

Concentration index values are interpreted according to the three specified ranges, indicates the level of competition on the market. The dependence between the level of concentration and the level of competition is inverse (Formula 2).

$$HHI_j = \begin{cases} 0 - 1000, \text{ market of weak concentration;} \\ 1000 - 1800, \text{ market of moderate concentration;} \\ > 1800, \text{ market of high concentration.} \end{cases} \quad (2)$$

For the purposes of further analysis all regions are ranked respectively to its shares as for the last period included in the study. It means that each region i with the average share for the period  $\bar{S}_{ij}$  is assigned the rank  $r_{js} = (1 \dots n)$ , where 1 – is the maximum value of the exponent, n - minimum. The resulting ranking of regions for each type of economic activity is taken as the initial and ongoing throughout the study

In order to determine the degree of specialization of the region in a particular EA there were used the coefficient of localization of industrial production that is used in practice for economic justification of production allocation (Gerasimova,2002). Localization is a measure, expressed as the ratio of shares of regional and industrial EA (Formula 3) (Hoover,1985).

$$L_{ij} = \frac{P_{ij}}{P_{im}} / \frac{P_{gi}}{P_{gm}}, \quad (3)$$

$L_{ij}$  – localization coefficient of industrial production for the i region and j type of economic activity;

$P_{im}$  – average headcount of region i in manufacturing industry m;

$P_{gm}$  – average headcount for the country's manufacturing industry g in manufacturing industry m.

The calculated values of the coefficient are interpreted in accordance with the following conditions (Safiullin,2011):



$L_{ij} =$

$$\begin{cases} > 1, \text{ core EA, has competitive advantages and potentially attractive for further} \\ & \text{development;} \\ = 1, \text{ EA operates on a local level, ocuses primarily on the domestic market;} \\ < 1, \text{ not core EA, domestic demand is replaced more by imports from other areas.} \end{cases}$$

To determine the relationship among the value of region's leading position and the level of localization we rank the regions towards the  $L_{ij}$  index using a similar method mentioned above.

Thus, the result of the first phase of the study within the framework of analyzed economic activities is the list of regions-producers on the market of EA. The share of each producers is greater than 1% ( $S_{ij} \geq 1$ ), since small values close to the level of statistical error. A total aggregate value of all region's shares cover the entire market, closely to 100% ( $\sum_{i=1}^n S_{ij} = 100\%$ ). For each of the region analyzed type of EA is a core (localization factor  $> 1$ ). Concentration factor characterizes market of each EA as a competitive or monopolistic. Producing regions, the corresponding the threshold of  $S_{ij}$  and  $L_{ij}$  are ranked relative to the importance on the EA's market. Thus, we get the ranking of regions for each EA for the further detailed analysis.

The second phase of the study includes an assessment of business environment and the attractiveness of the region for employees, realized through dynamic analysis of the internal socio-economic indicators. The choice of indicator is based on the fact that an essential part of the production process is labor, which productivity determines the degree of efficiency and maturity of a process.

The number of man-hours per one employee is a direct indicator of the effectiveness of his work. Of course, the value of the indicator will vary depending on type of economic activity, by virtue of production's distinctiveness, varying degrees of working time. However, within a single EA index values are comparable across regions and representative, as we assume that the production process, the composition of workers and equipment is the same for each manufacturer on the market (Formula 4) (Safiullin, 2011).

$$T_{ij} = \frac{T_{ij \text{ о6м}}}{P_{ij}}$$

(4)





$T_{ij}$  – number of man-hours per one employee of the region  $i$  and EA  $j$ ;

$T_{ij\text{ о6ш}}$  – total number of man-hours in the region  $i$  and EA  $j$ ;

$P_{ij}$  – average headcount in the region  $i$  and EA  $j$ .

To identify the producing regions with maximum and minimum values of the indicator  $T_{ij}$ , as well as to determine the values belonging to the leading regions on the market of EA  $j$ , the regions ranking to be conducted in respect of average  $T_{ij}$  indicator for the pre-crisis and post-crisis periods (Formula 5).

$$\bar{T}_{ij} = \frac{T_{ij\text{ n}} - T_{ij\text{ 0}}}{T_{ij\text{ 0}}},$$

(5)

Ranking was conducted as following: for each region's  $\bar{T}_{ij}$  value assigned the rank  $r_{jt} = (1 \dots n)$ , where 1 - the minimum value of the exponent,  $n$  - maximum.

The value of man-hour's cost is an important indicator for the producer in terms of opportunities to reduce costs, on the other hand it's an incentive for workers to change jobs in favor of a particular employer (Formula 6) (Safiullin, 2011).

$$C_{ij} = \frac{Z_{ij}}{T_{ij}}$$

(6)

$C_{ij}$  – the cost of man-hour per worker in the region  $i$  and EA  $j$ ;

$Z_{ij}$  – total payroll in the region  $i$  and EA  $j$ ;

$T_{ij}$  – the number of hours worked per one employee in the region  $i$  and EA  $j$ .

Similarly, to identify the producing regions with maximum and minimum values of the  $C_{ij}$  indicator, as well as to determine the values belonging to the leading regions in the EA  $j$  market, the regions ranking to be conducted in respect of average  $C_{ij}$  indicator for the pre-crisis and post-crisis periods.



Next, to determine the overall dependence of localization index, the cost of works and the number of working hours, a comparative analysis of index's ranks ( $r_{jl}$ ,  $r_{jc}$ ,  $r_{jt}$ ) for the two periods to be held, that will allow to determine which values of indicators have to possess in order to occupy a leading position on the market.

Salary level of EA j and region i is an important selection criterion for the allocation of production entity. However, in the regional context the wage levels are varying. Therefore, in order to give a more balanced assessment to the level of salary of the analyzed EA, wage index values are to be adjusted to the cost of living for each of the region (Formula 7) (Safiullin,2011).

$$W_{ij} = \frac{W'_{ij}}{CoL_i}$$

(7)

$W_{ij}$  – quality of employee's remuneration in the region i and EA j;

$W'_{ij}$  – average monthly salary per employee in the region i and EA j;

$CoL_i$  – cost of living set by the Russian Government for each region.

It is important to understand whether the specific EA is an engine of growth for the region which determines the trend of its future development. For this purpose dependence analysis of regional and EA's wages growth by region on the basis of average wage growth ( $\Delta \bar{W}_{ij}$ ) in the region i and EA j.

So, as a result of the second stage of the study for each of the region-producer resumed individual indicators of doing business and ranks in accordance with the importance of each of the indicators. This allow to assess the value level of selected indicators for the leading regions and to define the boundaries formed by market participants.

The third phase of the study is a cluster analysis of regions on the markets of analyzed economic activities. The purpose is to define the "ideal" clusters for each of the EA and to select those regions whose parameters satisfy the conditions of measured cluster. The challenge is to identify those regions, where each of the analyzed EA is a prioritized in terms of ease of doing business.



#### 4. RESULTS

As the result of the analysis of modern approaches and methods of clustering, for the study purposes was chosen method best meets the original objectives, i.e. the probability of region's getting in the boundaries of the "most preferred cluster" was estimated. Cluster analysis includes three main stages: identification of regions with minimum volatility of shares for the period under the study, the estimation of the cluster's boundaries, the evaluation of the probability of regions to get in the "ideal" cluster.

Firstly, estimate the initial rating of the regions concerning the volatility of their shares in the analyzed period. To assess the stability of the  $S_{ij}$  values, standard deviation indicator is calculated which is a measure of data dispersion. Thus, for each EA will be created the list of regions whose values will be the basis for forming the boundaries of the "basic" cluster. We assume that in order to take up the leading position on the market of EA  $j$ , the necessary and sufficient condition is to achieve a combination of indicator's values that are inherent to leaders.

Next we define the boundaries of the cluster, which are characterized by the values of adjusted cost of working hours ( $C'_{ij}$ ) and the number of hours per employee ( $T_{ij}$ ) (Formula 8).

$$C'_{ij} = C_{ij} \times W_{ij} \quad (8)$$

$C'_{ij}$  – the cost of working in the region  $i$  and EA  $j$ , adjusted to the index of exceedance the wages above the cost of living in the region  $i$ .

The cluster's boundaries are the maximum and minimum rates of historical data for each period:  $C_{jn}$  ( $C_{jn \min}$ ;  $C_{jn \max}$ ) and  $T_{jn}$  ( $T_{jn \min}$ ;  $T_{jn \max}$ ).

Then determine the probability of region's values getting in cluster boundaries. For that end, we appeal to the tools of binary logic, namely, the Boolean variable. In our case, we assign Boolean function matrix-like  $f(T''_{jn}; C''_{jn})$ . Boolean function represented by the conjunction of statements  $T''_{jn}$  and  $C''_{jn}$ , i.e. the function takes the "true" value if and only if both statements are true  $T''_{jn} \wedge C''_{jn}$  (Table 1) (Ravzieva, 2014).



**Table 1. Truth table**

$T''_{jn}$	$C''_{jn}$	$T''_{jn} \wedge C''_{jn}$
0	0	0
0	1	0
1	0	0
1	1	1

Thus, the region  $i$  with parameter values  $(T_i; C_i)$  gets into the cluster  $(T_{jn}; C_{jn})$  if there is a "true" value for both parameters. Assume that the region has a chance to hit the cluster in only case of historical fact of getting into the cluster's borders.

1. As a result, for each EA prepared a list of regions whose values had occasion to enter the cluster boundaries. Thus, for these regions analyzed EA is a prioritized for inclusion it in the region's industrial portfolio, having favorable conditions for the operation facilities and provides the best current position for leading regions.

## **5. DISCUSSION**

In relation of the growing dynamism of social and economic processes, the rapid change of internal and external markets conditions, in the face of fierce inter-regional competition and the need for sustainable development, regions must compete for various resources on the territory of the country. In this context, increases the role of regional management and strategic development in order to enhance the accumulated potential and to involve the regional economies in the market mechanisms of the country.

The presented methodology of study the doing business in terms of labor costs allows to establish the relationship between "favorable business climate" indicators accompanying the leading position of producers allow to identify the regions where the analyzed EA are prioritized in terms of production allocation cost on its territory. Cluster analysis allows to determine for each of the region those EAs considered prioritized and recommended for inclusion in the region's industrial portfolio.

Thus, the results of the research have the possibility of practical use as a supplemental for existing techniques of regional strategy development, assessment tools of regional competitiveness, may be reflected in the practice of designing and study the programs of



regional socio-economic planning, focusing on priorities of the region, taking into account cross-industry, cross-regional trends.

## **6. CONCLUSIONS**

The presented methodology allows conducting the complex structural diagnostics of factorial signs of EA, determining the major players and assessing the economic environment for these economic activities. Ultimately, this makes it possible to generate an attractive cluster in the regional context for each EA, thereby allowing region to identify strategic priorities and to develop recommendations for the design of industrial portfolio in the region.

## **7. ACKNOWLEDGEMENTS**

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